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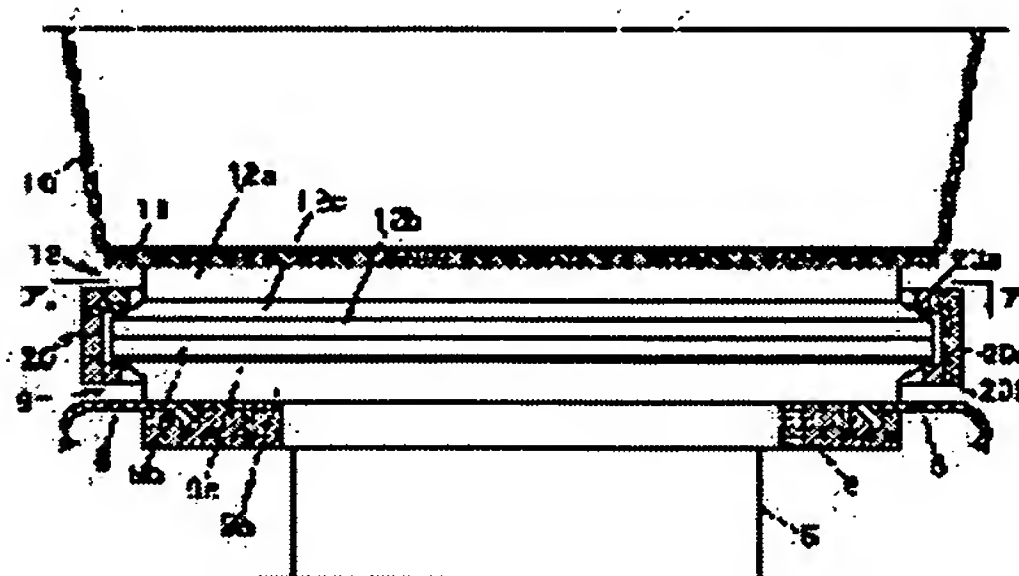
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## (54) TROUGH MOUNTING STRUCTURE FOR EXCITATION TYPE CARRYING DEVICE

## (57)Abstract:

PURPOSE: To suppress the local abrasive deterioration or damage to a member, prevent the generation of a hammering, and enhance the efficiency of attaching and detaching work while keeping satisfactory transmitting efficiency of vibration by easily and surely mounting a trough for carrying an article along the direction of the vibration by an exciter so as not to cause a looseness on the upper surface of the exciter.

CONSTITUTION: The lower rim 20b and upper rim 20a of an U-shaped sectional fastening ring are fastened to the tapered surface 9 of a locking member provided on an exciter side and the tapered surface 12c of a locking member 12 provided on a trough 10 side to mutually engage them. The disc parts 9b, 12b of both the locking members 9, 12 and the fastening ring 20 are formed into circular flat forms, so that the pressing force horizontally acting on each tapered surface 9c, 12c by fastening or the locking force converted into a vertically acting pressing force can be applied over all the circumferential edge parts of both the locking members 9, 12.



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CLAIMS

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[Claim(s)]

[Claim 1] The shaker side stop plate which is the structure of attaching the trough which shows goods to the top face of a shaker along the oscillating direction, and was attached in the top face of the above-mentioned shaker, and the inferior surface of tongue of a trough possible [ opposite \*\* ], respectively, and a trough side stop plate, While having the clamping ring which has the engagement member to which it engages with the periphery section of both the above-mentioned stop plate, a cross section being used as the shape of a KO character The periphery section inferior surface of tongue of the above-mentioned shaker side stop plate, the periphery section top face of the above-mentioned trough side stop plate, At least one field of the top face inside [ KO character-like cross-section ] the above-mentioned engagement member or the inferior surface of tongue inside [ KO character-like cross-section ] this engagement member is made into a taper side. Trough installation structure of the excitation type transport device characterized by establishing a diameter reduction means to be constituted so that the periphery section and the engagement member of both the stop plate may be engaged through this taper side, and to make the path reduce to a clamping ring.

[Claim 2] Trough installation structure of the excitation type transport device according to claim 1 characterized by the clamping ring having the engagement member over the perimeter.

[Claim 3] Trough installation structure of the excitation type transport device according to claim 1 characterized by for an engagement member being an engagement member which engages with a part of periphery section of a shaker side stop plate and a trough side stop plate, and a clamping ring being the ring member which attached two or more above-mentioned engagement members.

[Claim 4] Trough installation structure of the excitation type transport device according to claim 1 characterized by establishing the diameter reduction means between the other-end sections of both parts while a clamping ring is divided into two abbreviation semicircle-like parts and closing motion of both parts is connected possible in one edges of both [ these ] parts.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the trough installation structure of the excitation type transport device which conveyed this conveyed object along the oscillating direction, giving vibration to the conveyed object on a trough with the excitation equipment which makes an electromagnet etc. the source of vibration.

[0002]

[Description of the Prior Art] Generally, a trough is attached in excitation equipment in an excitation type transport device, and although the conveyed object on a trough is conveyed along the oscillating direction by giving this vibration, since various goods including food are conveyed as a conveyed object, removing a trough from excitation equipment for cleaning etc. is performed frequently.

[0003] Therefore, the structure and the device simply and which the attachment and detachment to the excitation equipment of this trough can be ensured are desired from the field of working efficiency.

[0004] For example, each inclined plane formed in two positioning members C and D which fixed before and behind the top face of Mount B when laying the bottom plate A of a trough in the trough mount B, as shown in JP,57-46828,U at drawing 18 , Each inclined plane formed in two contact-carrying members E and F which fixed before and behind the rear face of a bottom plate A is made to contact closely, and the trough attachment equipment which established the toggle pinching device G which presses and pinches the trough bottom plate A in the direction of the trough mount B in this condition is indicated.

[0005] In case the trough bottom plate A is attached, it can fix so that this trough bottom plate A may be forced on the trough mount B from above and both may be pinched according to the toggle pinching device G, and in case it removes, what is necessary will be just to remove the pinching force by this toggle pinching device G according to this.

[0006]

[Problem(s) to be Solved by the Invention] By the way, since a conveyed object is conveyed leftward [ drawing top ] here, excitation equipment will give vibration of a longitudinal direction to a trough like the arrow head shown all over drawing.

[0007] Therefore, in the above-mentioned equipment, if this oscillating force is resisted and the pinching force of the toggle pinching device G is not set up sufficiently greatly so that location gap may not be caused under the effect of vibration of the trough bottom plate A of this longitudinal direction, slack will arise in installation of a trough. Moreover, since fixation of the trough bottom plate A is made through the positioning members C and D, contact-carrying members E and F, and the toggle pinching device G, only these members will receive the oscillating force locally and a possibility slack not only arises, but that it may carry out wear degradation and may be damaged in installation of a trough by use for years also has them.

[0008] And if slack arises in installation of a trough, while a tap tone etc. will occur at the time of vibration, the transmission efficiency of the oscillating force transmitted to a trough from excitation equipment will fall, and the conveyance capacity of a conveyed object will be reduced.

[0009] Then, this invention is the trough installation structure simply and where attachment and detachment of the trough in an excitation type transport device can be ensured, and offers a technical problem trough installation structure which there are no degradation and damage on a member, consequently induces neither the tap tone at the time of vibration, nor the decline in the transmission efficiency of the oscillating force.

[0010]

[Means for Solving the Problem] Namely, invention (henceforth "the 1st invention") of this application according to claim 1 The shaker side stop plate which is the structure of attaching the trough which shows goods to the top face of a shaker along the oscillating direction, and was attached in the top face of the above-mentioned shaker, and the inferior surface of tongue of a trough possible [ opposite \*\* ], respectively, and a trough side stop plate, While having the clamping ring which has the engagement member to which it engages with the periphery section of both the above-mentioned stop plate, a cross section being used as the shape of a KO character The periphery section inferior surface of tongue of the above-mentioned shaker side stop plate, the periphery section top face of the above-mentioned trough side stop plate, At least one field of the top face inside [ KO character-like cross-section ] the above-mentioned engagement member or the inferior surface of tongue inside [ KO character-like cross-section ] this engagement member is made into a taper side. It is related with the trough installation structure of the excitation type transport device characterized by establishing a diameter reduction means to be constituted so that the periphery section and the engagement member of both the stop plate may be engaged through this taper side, and to make the path reduce to a clamping ring.

[0011] Moreover, invention (henceforth "the 2nd invention") of this application according to claim 2 is characterized by the clamping ring in the 1st invention of the above having the engagement member over the perimeter.

[0012] And invention (henceforth "the 3rd invention") of this application according to claim 3 is characterized by for the engagement member in the 1st invention of the above being an engagement member which engages with a part of periphery section of a shaker side stop plate and a trough side stop plate, and a clamping ring being the ring member which attached two or more above-mentioned engagement members.

[0013] On the other hand, invention (henceforth "the 4th invention") of this application according to claim 4 is characterized by establishing the diameter reduction means between the other-end sections of both parts while the clamping ring in the 1st invention of the above is divided into two abbreviation semicircle-like parts and closing motion of both parts is connected possible in one edges of both [ these ] parts.

[0014]

[Function] According to the 1st invention of the above, a shaker side stop plate and the trough side stop plate of each other are attached in the top face of a shaker, and the inferior surface of tongue of a trough possible [ opposite \*\* ], respectively. By reducing the path for the clamping ring which has the engagement member of the shape of a cross-section KO character which engages with the periphery section of both these stop plates by the diameter reduction means, both the above-mentioned stop plate will \*\* an opposite, and it will be stopped, consequently a trough will be attached in a shaker.

[0015] In the part to which the engagement member and both the stop plate of a clamping ring are engaged here, although the stop force for trough installation will act on both the stop plate Since it is the periphery section of both the stop plate that this engagement member engages with both the stop plate, the part where the stop force acts will not be fixed to one place, and the stop force will act also in not only the oscillating direction [ stop / according to a shaker ] but this oscillating direction, and the direction which makes a predetermined include angle. Consequently, only some members are locally worn out in response to the oscillating force, or what is damaged is avoided.

[0016] Furthermore, the periphery section inferior surface of tongue of the above-mentioned shaker side stop plate, the periphery section top face of the above-mentioned trough side stop plate, Since it is constituted so that the periphery section and the engagement member of both



the stop plate may be engaged through this taper side, at least one field of the top face inside [ KO character-like cross-section ] the above-mentioned engagement member or the inferior surface of tongue inside [ KO character-like cross-section ] this engagement member being used as a taper side. The bolting force in case the path of a clamping ring follows on being reduced and the KO character-like cross-section inside of an engagement member engages with the periphery section of both the stop plate from a horizontal direction with a diameter reduction means will be exerted on a taper side, and it will be changed into the stop force which sticks both the stop plate in the vertical direction by pressure. Consequently, a shaker side stop plate and a trough side stop plate are stuck by pressure firmly, and since firm installation of a trough is realized, while slack does not arise and the oscillating force of a shaker is efficiently transmitted to a trough, generating of the tap tone at the time of vibration etc. is lost.

[0017] Moreover, according to the 2nd invention of the above, since the clamping ring has the engagement member over the perimeter, in case an engagement member engages with both the stop plate, it will engage with the perimeter edge. Therefore, the engaged part will cross and exist in the perimeter edge of both the stop plate, and the stop force for trough installation will act in all the directions over both the stop plate. Consequently, in the oscillating direction by the shaker, and the direction which makes all include angles, since the stop force which sticks both the stop plate in the vertical direction by pressure acts, while the local wear and the damage on some members are avoided further, sticking by pressure of both the stop plate will become still firmer.

[0018] And since according to the 3rd invention of the above an engagement member is an engagement member which engages with a part of periphery section of a shaker side stop plate and a trough side stop plate and a clamping ring is the ring member which attached two or more above-mentioned engagement members. It becomes possible to exchange components and to carry out mutual use between the ring members of various die length and engagement members according to the periphery section die length of a stop plate, and the clamping ring which can respond to various conditions will be obtained.

[0019] Moreover, since the number of the engagement members attached in a ring member can be chosen, lightweight-ization of a clamping ring will be attained that what is necessary is for the oscillating force to be comparatively small, consequently to attach an engagement member only for a necessary minimum number when the stop force which can resist this oscillating force is acquired, even if it does not make the stop force act on the perimeter edge of a stop plate, for example.

[0020] On the other hand, while according to the 4th invention of the above a clamping ring is divided into two abbreviation semicircle-like parts and closing motion of both parts is connected possible in one edges of both [ these ] parts. Since the diameter reduction means is established between the other-end sections of both parts, the other-end sections can be made to opposite-**\*\*** by making the other-end sections desert or closing conversely by opening two semicircle parts by using above-mentioned one edge as the supporting point. Therefore, in case it equips with this clamping ring, or in case it removes, while it can carry out through the space which the other-end sections were made to desert and was produced and the handling at the time of attachment and detachment of a clamping ring becomes easy, during wearing, the other-end sections will be made to opposite-**\*\***, with the diameter reduction means established among these, and it will **\*\*** to the increase in efficiency of the attachment-and-detachment activity of a trough. [ a clamping ring ]

[0021]

[Example] Hereafter, the example of this invention is explained based on a drawing.

[0022] Drawing 1 is the side elevation showing the excitation type transport device concerning the 1st example of this invention, and shows the condition that the trough 10 is attached in the body 1 of excitation equipment.

[0023] First, the shaker 2 which makes an electromagnet the source of vibration at the body 1 of excitation equipment is built in, and the trough mount 4 is horizontally installed in the flat spring 3--3 used as the transfer medium of vibration by this shaker 2. While cylinder-like the supporter material 5 for trough attachment and the support board 6 are attached in the top face of this

mount 4 at this order, the seal member 8 which consists of an elastic body is formed over between this support board 6 and the equipment bases 7 which it had so that the upper part of the body 1 of excitation equipment might be covered horizontally, and it is made as [ enter / at the time of washing of the above-mentioned equipment base 7 etc. / into the body 1 of excitation equipment / a foreign matter ].

[0024] Moreover, while fixed installation of the shaker side stop member 9 is carried out on the top face of the above-mentioned support board 6 for trough attachment, the trough side stop member 12 is similarly fixed to the inferior surface of tongue of a trough 10 through the trough bottom plate 11. And it is equipped with the clamping ring 20 for trough attachment so that the peripheral face of both [ these ] the stop members 9 and 12 may be surrounded, and with this ring 20, the above-mentioned trough side stop member 12 is stuck to the shaker side stop member 9 by pressure, and is attached.

[0025] When the structure of both the above-mentioned stop members 9 and 12 and a clamping ring 20 is explained, as the shaker side stop member 9 and the trough side stop member 12 consist of a part of two upper and lower sides formed in the cross-section round shape, respectively and it is shown in drawing 2 Disk inferior-surface-of-tongue 9c from this bearing section 9a to [ c / a part for bearing section 9a and the upper part is set to disk section 9b, and ] disk section 9b is first formed in the taper side where the amount of [ which touches the above-mentioned support board 6 in the shaker side stop member 9 ] lower part projects in the direction of outside at an angle of predetermined. In addition, the top face of disk section 9b is prepared flatly.

[0026] On the other hand, disk top-face 12c from this bearing section 12a to [ c / a part for bearing section 12a and the lower part is set to disk section 12b, and ] disk section 12b is formed in the taper side where the amount of [ which touches the above-mentioned trough bottom plate 11 in the trough side stop member 12 ] upper part projects in the direction of outside at an angle of predetermined like the above-mentioned shaker side disk inferior-surface-of-tongue 9c. In addition, the inferior surface of tongue of disk section 12b is flatly prepared like the above-mentioned shaker side disk top face.

[0027] At this time, both the stop members 9 and 12 are formed so that the direction of the path of the disk sections 9b and 12b may be set up mutually equally [ the path of a cross-section circle ] more greatly than the path of the bearing sections 9a and 12a and both the above-mentioned bearing sections 9a and 12a and both the disk sections 9b and 12b may become up and down symmetrical at the time of attachment.

[0028] And the top face of shaker side disk section 9b formed flatly, respectively and the inferior surface of tongue of trough side disk section 12b are stuck so that the core of a cross-section circle may be in agreement, the trough side stop member 12 is laid on the shaker side stop member 9, and the clamping ring 20 is being engaged to both the disk sections 9b and 12b that project in the direction of outside here.

[0029] As the ring 20 for this trough attachment was shown in drawing 2 , upper rim 20a, While considering as the shape of a KO character to which the cross section which has bottom rim 20b which has a little short level die length, and side rim 20c, and is constituted from this upper rim 20a by each [ these ] rim caves in inside It is formed in the shape of [ which has the part which is made circular as the whole shows drawing 3 , and does not follow the part ] a C character. Moreover, the both ends of this discontinuous part are built over the diameter reduction equipment 21 to which the path of the ring 20 concerned is made to reduce, and it is prepared in them.

[0030] And when the lever 22 of diameter reduction equipment 21 is pushed down and the path of a clamping ring 20 is made to reduce As shown in above-mentioned drawing 2 R> 2 and drawing 3 , while the periphery section of the disk sections 9b and 12b enters into a concavity, without contacting side rim 20c of the ring 20 concerned The path of ring 20 each part is set up based on the dimension of the above-mentioned stop members 9 and 12 so that upper rim 20a and bottom rim 20b may contact the taper sides 12c and 9c, respectively.

[0031] Therefore, at the time of with [ this ] a bundle, the path of a clamping ring 20 will follow on being reduced, and upper rim 20a, bottom rim 20b, and side rim 20c will move to inboard

horizontally, consequently upper rim 20a and bottom rim 20b will give the bolting force from a horizontal direction to the taper sides 12c and 9c of the above-mentioned stop members 9 and 12. Since the taper sides 12c and 9c where upper rim 20a and bottom rim 20b give the bolting force here, respectively have the predetermined include angle as mentioned above It is changed into the sticking-by-pressure force done from the horizontal direction in which bind tight and a part of force acts the shaker side stop member 9 in the direction of drawing 2 Nakagami in the direction of drawing 2 R>2 Nakashita, and taper side 9c in taper side 12c, respectively in the trough side stop member 12.

[0032] The trough side stop member 12 will be firmly stopped by the shaker side stop member 9, and installation to the body 1 of excitation equipment of a trough 10 is realized by this.

Moreover, since the clamping ring 20 is formed in the shape of radii, the stop force which upper rim 20a and bottom rim 20b will contact the perimeter edge of the stop members 12 and 9, respectively, consequently sticks both [ these ] the stop members 9 and 12 in the vertical direction by pressure will act equally at the above-mentioned perimeter edge. Therefore, since the stop force acts on the stop members 9 and 12 in all directions irrespective of the oscillating direction by the shaker 2, while it is lost that the effect by vibration is locally done to some members, installation of the firm trough 10 is attained.

[0033] On the other hand, when removing a trough 10, upper rim 20a and bottom rim 20b are made to desert the taper sides 12c and 9c, respectively by raising the lever 22 of diameter reduction equipment 21, and making the path of a clamping ring 20 expand, as shown in drawing 4 R> 4, and the stop force in which it was acting on the trough side stop member 12 and the shaker side stop member 9 is removed. It binds tight, the force is canceled and it is set to the location which the above-mentioned lever 22 illustrated by returning to the configuration which was given to the clamping ring 20 by diameter reduction equipment 21 here and which the path expanded as this ring 20 illustrated.

[0034] And while bottom rim 20b with a little short horizontal die length separates from shaker side disk section 9b completely as shown in drawing 5 when this clamping ring 20 returns to the original configuration, the path of the ring 20 each part concerned is set up based on the dimension of the above-mentioned stop members 9 and 12 so that upper rim 20a with a little long horizontal die length may catch and remain on taper side 12c of the trough side stop member 12.

[0035] By this, even if it cancels bolting of a clamping ring 20, the ring 20 concerned separates, and does not fall from the stop members 9 and 12, and a ring 20 does not carry out fall damage. Moreover, since the trough side stop member 12 thru/or a trough 10 can be removed from the body 1 of excitation equipment with the ring 20 concerned, dispersion of a member is avoidable.

[0036] When removing a clamping ring 20 from the trough side stop member 12, the lever 22 of the above-mentioned diameter reduction equipment 21 is pushed down to the time of with a bundle, and an opposite direction, and it is carried out by making the path of the above-mentioned ring 20 expand further until upper rim 20a separates from trough side disk section 12b completely, as the chain line showed to drawing 5 .

[0037] Moreover, as the chain line showed to above-mentioned drawing 3 , the height 23 which projects to inboard will be formed in a part of clamping ring 20, when the cavity 13 in which this height 23 can be inserted is formed in the stop members 9 and 12, a clamping ring 20 will be positioned to these stop members 9 and 12, a diameter reduction equipment's 21 which detaches and attaches trough's 10 existence part becomes clear, and working efficiency will improve.

[0038] Like diameter reduction equipment 21' which the diameter reduction equipment which performs bolting and its discharge of a clamping ring 20 here is not restricted to the thing of a device explained above, but is shown in drawing 6 Lever 21b' which carries out interior free [ rotation ] at one edge of a ring 20 for stopper pin 21a' with \*\*\*\*\* Hanging projection 21c' which has the configuration which can hang and stop this stopper pin 21a' to the other end of the ring 20 which counters is prepared, above-mentioned lever 21b' is pushed down at the time of bolting, and what has the device which hangs the pin 21a' on above-mentioned hanging member 21c', and stops it can be used.

[0039] Next, the 2nd example of this invention is explained.



[0040] The ring member 31 formed in the shape of [ which has the part which does not follow a part as the clamping ring 30 in this example is shown in drawing 7 ] a C character, this -- a ring -- a member -- 31 -- an inside -- regular intervals -- arranging -- having had -- seven -- a piece -- engagement -- a member -- 32 -- 32 -- and -- the -- discontinuous -- a part -- both ends -- arranging -- having had -- two -- a piece -- being small -- engagement -- a member -- 32 -- ' -- 32 -- ' -- having -- while -- The both ends of this discontinuous part are built over the diameter reduction equipment 21 to which the path of the above-mentioned ring member 31 is made to reduce, and it is prepared in them.

[0041] As shown in drawing 8, the above-mentioned engagement member 32 and 32' Upper rim 32a, It has bottom rim 32b which has level die length a little shorter than this upper rim 32a, and side rim 32c. While considering as the shape of a KO character to which the cross section constituted by each [ these ] rim caves in inside and attaching the external surface of side rim 32c in the inside of the ring member 31, each engagement member 32 and 32' As shown in drawing 7, it engages with a part of disk sections 9b and 12b of the stop members 9 and 12.

[0042] And bolting of the clamping ring 30 concerned is performed by pushing down the lever 22 of diameter reduction equipment 21, and making the path of the ring member 31 reduce. The taper sides 12c and 9c where top rim 32a and bottom rim 32b are engaged, respectively at this time are contacted. The stop force which sticks the trough side stop member 12 and the shaker side stop member 9 by pressure up and down as well as the 1st example mentioned above will act, and a trough 10 will be attached in the body 1 of excitation equipment.

[0043] here -- seven -- a piece -- engagement -- a member -- 32 -- 32 -- and -- two -- a piece -- being small -- engagement -- a member -- 32 -- ' -- 32 -- ' -- regular intervals -- arranging -- having -- \*\*\*\* -- since -- a part -- a member -- a shaker -- two -- from -- vibration -- local -- winning popularity -- things -- there is nothing -- while -- a stop -- the force -- a stop -- a member -- nine -- 12 -- a periphery -- the section -- equal -- doing -- having -- since -- balance -- being good -- being firm -- a trough -- ten -- installation -- being possible -- \*\* -- becoming .

[0044] moreover -- a clamping ring -- 30 -- engagement -- a member -- 32 -- 32 -- ' -- a ring -- a member -- 31 -- attaching -- having -- becoming -- since -- a disk -- the section -- nine -- b -- 12 -- b -- a periphery -- length -- having responded -- versatility -- die length -- a ring -- a member -- 31 -- engagement -- a member -- 32 -- 32 -- ' -- between -- combination -- changing -- a clamping ring -- 30 -- \*\* -- it can carry out -- a member -- mutual -- use -- being possible -- \*\* -- becoming .

[0045] Furthermore, since the number of the engagement member 32 attached in the ring member 31 and 32' can be chosen, the oscillating force will be comparatively weak, it will also be possible to reduce the number of the engagement member 32 and 32' to six pieces, when installation of the trough 10 which can resist this oscillating force is possible, even if the stop force which should be given to the stop members 9 and 12 as a result is small, and it will \*\* to lightweight-ization of a clamping ring 30, for example. In addition, in order to attach a trough 10 with sufficient balance also in this case, it is desirable to arrange the engagement member 32 and 32' at equal intervals.

[0046] And the both ends of this wire member 41 are built over diameter reduction equipment 51 through small two engagement member 42' and 42', and the clamping ring 40 in the 3rd example of this invention is prepared in them while it has the wire member 41 and seven engagement members 42--42 arranged at equal intervals by this wire member 41, as shown in drawing 9.

[0047] As shown in drawing 10, 42d of holes through which it pierces horizontally is prepared in side rim 42c of the above-mentioned engagement member 42. When the above-mentioned wire member 41 penetrates 42d of these holes, while each engagement member 42--42 is attached in the wire member 41 small two engagement member 42' and 42' prepare for diameter reduction equipment 51 -- having -- these engagement member 42' and 42' -- it is alike, respectively and the both ends of the wire member 41 are attached.

[0048] Therefore, in this clamping ring 40, it can carry out easily only by being able to attach only by letting the engagement member 42--42 pass to the wire member 41, and shifting positioning of the engagement member 42--42 right and left.

[0049] Furthermore, the 4th example of this invention is shown in drawing 11 . The clamping ring 60 in this example connects two engagement members 61 of the hemicycle by which the cross section was made the shape of a KO character, and 61' with a hinge 62 rockable, and this engagement member 61, the connection member 70 which has hook 71 in the other end of 61', and the hanging member 72 which hangs and stops this hook 71 are formed, respectively.

[0050] And at the time of wearing of a clamping ring 60, by bringing both the engagement member 61 and the other ends of 61' close, hanging hook 71 on the hanging member 72, and pushing down the lever 73 of the connection member 70, the clamping ring 60 whole becomes continuously circular, and will stick two stop members 9 and 12 by pressure.

[0051] On the other hand, when removing a clamping ring 60 from the stop members 9 and 12, the clamping ring 60 concerned can be horizontally sampled from the stop members 9 and 12 by making the other ends desert and enlarging this estrangement spacing with a hinge 62 by raising a lever 73 and separating hook 71 from the hanging member 72.

[0052] Therefore, where the trough side stop member 12 is laid on the shaker side stop member 9, it becomes possible from a perimeter about this clamping ring 60 wearing or to sample, handling [ ring / 60 ] becomes easy, and the attachment-and-detachment activity of a trough will be done efficiently.

[0053] Moreover, if a height 82 and 82' are prepared in the engagement member 81 and the edge of 81', respectively, hole 82a of the major diameter which does not have screw hole 82a' in this height 82', and does not have the screw section in a height 82 is formed and a screw 83 ties both the heights 82 and 82' as it replaces with the above-mentioned hinge 62 and is shown in drawing 12 , the path at the time of bolting of a clamping ring 80 can be adjusted with a screw 83.

[0054] As furthermore shown in drawing 13 , the interior of lever 73' of a connection member is made hollow. If the interior of the sliding of the slide block 74 which attached the hook 71 here is made free and it is made to make a screw 75 screw in this block 74 on both sides of a side attachment wall from the exterior of lever 73' By rotation of this screw 75, a slide block 74 can move in the interior of lever 73', the distance between hook 71 and the hanging member 72 can change, and the bolting force of a clamping ring 60 can be adjusted.

[0055] As shown in drawing 14 on the other hand, hanging member 72' Cross-section KO character-like casing 72a', this -- casing -- 72 -- a -- ' -- a tooth back -- screwing -- penetration -- carrying out -- a screw -- 72 -- b -- ' -- this -- a screw -- 72 -- b -- ' -- an edge -- rotation -- free -- attaching -- having -- Even if it makes it constitute from stopper member 72c' which is fitted in the interior of above-mentioned casing 72a', and hangs and stops hook 71 By rotation of screw 72b', stopper member 72c' can move in the interior of casing 72a', the distance between stopper member 72c' and hook 71 can change, and the bolting force of a clamping ring 60 can be adjusted.

[0056] In addition, in each example explained above, while forming disk inferior-surface-of-tongue 9c of the shaker side stop member 9, and disk top-face 12c of the trough side stop member 12 in a taper side Although the case where a bottom rim of clamping ring 20 which carries out contact engagement with each [ these ] field, respectively 20b top face, and an upper rim 20a inferior surface of tongue were made into a horizontal plane was shown For example, the inferior surface of tongue of upper rim 90a and the top face of bottom rim 90b are made into a taper side so that it is close to side rim 90c which constitutes the shape of a cross-section KO character and vertical spacing may become small, as shown in drawing 15 . a shaker -- a side -- a stop -- a member -- nine -- ' -- a disk -- an inferior surface of tongue -- nine -- c -- ' -- and -- a trough -- a side -- a stop -- a member -- 12 -- ' -- a disk -- a top face -- 12 -- c -- ' -- a taper -- a field -- \*\* -- not carrying out -- a \*\* -- flat -- forming -- even if -- At the time of bolting of the clamping ring concerned, disk section 9b' and the thrust exerted on 12b' horizontally It will be changed into the stop force which sticks shaker side stop member 9' for trough side stop member 12' by pressure in the direction of drawing Nakagami in the direction of drawing Nakashita, and bottom rim 90b in upper rim 90a, respectively, and both stop member 9' and 12' will be stopped firmly.

[0057] Moreover, as shown in drawing 16 , only the bottom rim of clamping ring 90b side is made

into a taper side, and when supposing that other fields are flat, or by making only disk inferior-surface-of-tongue 9c[ of shaker side stop member 9' ]' into a taper side as shown in drawing 17 when other fields are flat, both the stop member will be stuck in the vertical direction by pressure, and it is contained in the technical thought of this invention.

[0058] That is, the disk inferior surface of tongue of the shaker side stop member which carries out contact engagement mutually at the time of ring bolting, If at least one field of the disk top face of a trough side stop member, the inferior surface of tongue of a clamping ring top rim, or the top face of a bottom rim is formed in the taper side Since it binds tight through this taper side, the force is changed into the sticking-by-pressure force of the vertical direction and a trough 10 can be stopped on the body 1 of excitation equipment, when it illustrates above, it is not restricted, but any one or more fields of four above-mentioned fields can be made into a taper side.

[0059] Furthermore, although only the case where the clamping ring which engages with a shaker side stop member, a trough side stop member, and these was circularly formed in the above example was shown Since it is not limited to this, and the site of action of the stop force at the time of attaching a trough in a shaker also as polygons, such as an ellipse form, a hexagon, or an octagon, is not fixed only to an one direction but it goes across this invention in the other directions, the same operation effectiveness is acquired.

[0060]

[Effect of the Invention] As explained above, according to this invention, the effect of the oscillating force local irrespective of plurality and the oscillating direction by the shaker since it exists equally is reduced for the site of action of the stop force for the trough installation produced by bolting of a clamping ring by the periphery section of a shaker side stop member and a trough side stop member, and the local wear and the damage on a member are avoided.

[0061] Moreover, since engagement to a shaker side stop member and a trough side stop member, and a clamping ring is performed through a taper side, as a result of being changed into the stop force in which the thrust done from the horizontal direction sticks both the stop member in the vertical direction by pressure and attaching a trough firmly, while slack does not arise but the oscillating force of a shaker is efficiently transmitted to a trough, generating of the tap tone at the time of vibration etc. is lost.

[0062] Furthermore, as a result of being able to reduce the number of engagement members by the strength of the oscillating force of a shaker while being able to respond to the stop member of various magnitude by exchange of components if it is the configuration which attaches two or more engagement members in a ring member possible [ desorption ] as a clamping ring, lightweight-ization of a clamping ring will be attained efficiently.

[0063] On the other hand, when it does not have the shape of a continuous cyclic permutation, and a clamping ring is divided into two semicircle-like parts and connected possible [ closing motion of each edges ], wearing or removal of the clamping ring concerned becomes easy through the space produced by closing motion of this semicircle-like part, and it will \*\* to the increase in efficiency of the attachment-and-detachment activity of a trough.

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[Translation done.]



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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] It is the side elevation showing the excitation type transport device concerning the 1st example of this invention.

[Drawing 2] It is the important section expansion fragmentary sectional view of the above-mentioned excitation type transport device.

[Drawing 3] It is a horizontal sectional view in the A-A line shown in drawing 2 .

[Drawing 4] It is a horizontal sectional view in the A-A line shown in drawing 2 explaining an operation of the above-mentioned example.

[Drawing 5] It is the important section expansion fragmentary sectional view of the excitation type transport device in the condition which shows in drawing 4 .

[Drawing 6] It is the level important section enlarged drawing showing another mode of the diameter reduction equipment in the 1st example of the above.

[Drawing 7] It is the important section horizontal sectional view of the excitation type transport device concerning the 2nd example of this invention.

[Drawing 8] It is a partial side elevation in the condition which shows in drawing 7 .

[Drawing 9] It is the important section horizontal sectional view of the excitation type transport device concerning the 3rd example of this invention.

[Drawing 10] It is a partial side elevation in the condition which shows in drawing 9 .

[Drawing 11] It is the top view of the clamping ring in the 4th example of this invention.

[Drawing 12] It is the partial enlarged drawing showing another mode of the clamping ring in the 4th example of the above.

[Drawing 13] It is the partial enlarged drawing showing another mode of the clamping ring in the 4th example similarly.

[Drawing 14] It is the partial enlarged drawing showing another mode of the clamping ring in the 4th example similarly.

[Drawing 15] It is the important section expansion fragmentary sectional view of the excitation type transport device in another example.

[Drawing 16] It is the important section expansion fragmentary sectional view of the excitation type transport device in same another example.

[Drawing 17] It is the important section expansion fragmentary sectional view of the excitation type transport device in same another example.

[Drawing 18] It is an explanatory view about the trouble in the conventional excitation type transport device.

### [Description of Notations]

1 Body of Excitation Equipment

2 Shaker

9 Shaker Side Stop Member

9c, 12c Taper side

10 Trough

12 Trough Side Stop Member

20 Clamping Ring



## 21 Diameter Reduction Equipment

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[Translation done.]

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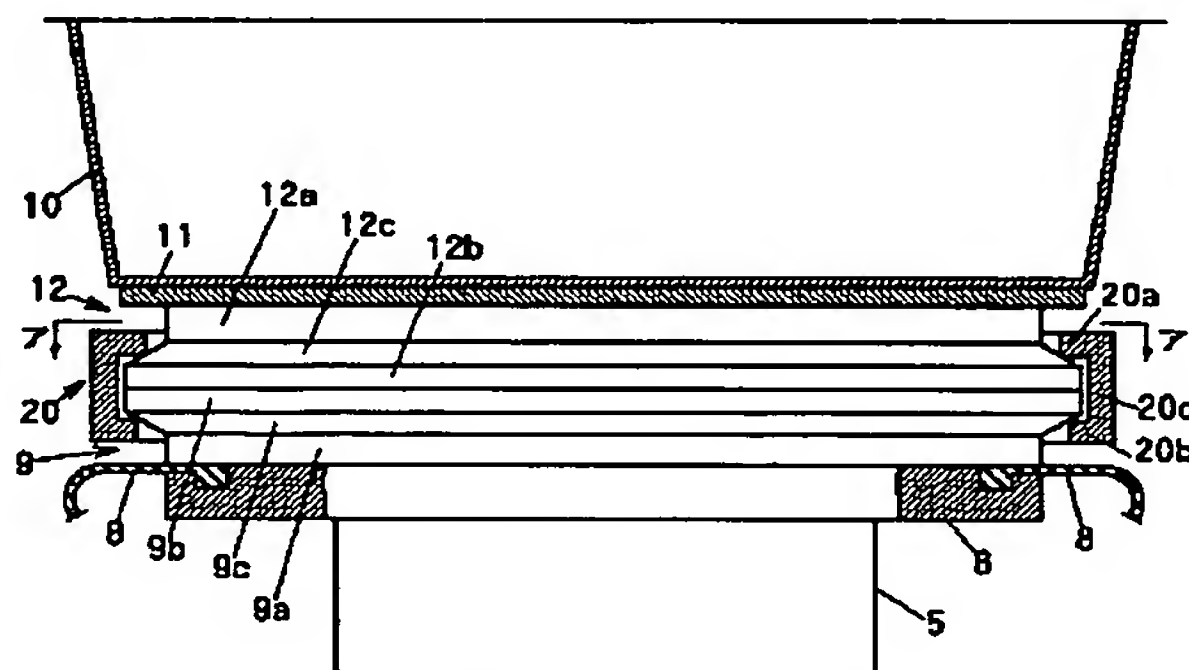
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(54) 【発明の名称】 加振式搬送装置のトラフ取り付け構造

(57) 【要約】

【目的】 加振器による振動の方向に沿って物品を搬送するトラフを、該加振器の上面に弛みが生じないように簡単確実に取り付けることにより、該振動の良好な伝達効率を維持しつつ、部材の局所的な摩耗劣化や損傷の抑制と打音等の発生の防止、並びに着脱作業の効率化を目的とする。

【構成】 加振器側に設けられている係止部材9のテーパ面9cと、トラフ10側に設けられている係止部材12のテーパ面12cとに、断面コ字状の締め付けリング20の下リム20b及び上リム20aを締め付けて係合させる。両係止部材9、12のディスク部9b、12b及び締め付けリング20の平面形状を円形とし、締め付けにより各テーパ面9c、12cに水平方向に作用する押圧力ないし該テーパ面9c、12cにより上下方向に作用する圧着力に変換された係止力が両係止部材9、12の周縁部全てに渡って及ぼされるように構成する。



## 【特許請求の範囲】

【請求項1】 加振器の上面に、その振動方向に沿って物品を案内するトラフを取り付ける構造であって、上記加振器の上面とトラフの下面とに互いに対接可能にそれぞれ取り付けられた加振器側係止板及びトラフ側係止板と、断面がコ字状とされて上記両係止板の周縁部に係合する係合部材を有する締め付けリングとを有すると共に、上記加振器側係止板の周縁部下面、上記トラフ側係止板の周縁部上面、上記係合部材のコ字状断面内側の上面又は該係合部材のコ字状断面内側の下面の少なくとも一つの面がテーパ面とされて、該テーパ面を介して両係止板の周縁部と係合部材とが係合するように構成され、かつ締め付けリングにその径を縮小させる縮径手段が設けられていることを特徴とする加振式搬送装置のトラフ取り付け構造。

【請求項2】 締め付けリングがその全周に渡って係合部材を有していることを特徴とする請求項1に記載の加振式搬送装置のトラフ取り付け構造。

【請求項3】 係合部材が加振器側係止板及びトラフ側係止板の周縁部の一部分に係合する係合部材であって、締め付けリングが、複数個の上記係合部材を取り付けたリング部材であることを特徴とする請求項1に記載の加振式搬送装置のトラフ取り付け構造。

【請求項4】 締め付けリングが2つの略半円状部分に分割され、これら両部分の一方の端部同士が両部分の開閉を可能に連結されていると共に、両部分の他方の端部間に縮径手段が設けられていることを特徴とする請求項1に記載の加振式搬送装置のトラフ取り付け構造。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、電磁石等を振動源とする加振装置によってトラフ上の被搬送物に振動を与えながら該被搬送物をその振動方向に沿って搬送するようにした加振式搬送装置のトラフ取り付け構造に関する。

## 【0002】

【従来の技術】 一般に加振式搬送装置においては、トラフを加振装置に取り付け、これに振動を与えることによりトラフ上の被搬送物をその振動方向に沿って搬送するものであるが、被搬送物として食品を始めとする種々の物品が搬送されるため、トラフを清掃等のために加振装置から取り外すことが頻繁に行われる。

【0003】 従って、かかるトラフの加振装置に対する着脱を簡単且つ確実に行うことができる構造や機構が作業効率の面から望まれている。

【0004】 例えば実開昭57-46828号公報には、図18に示すように、トラフの底板Aをトラフ取付台Bに載置する際に、取付台Bの上面の前後に固着された二つの位置決め部材C及びDに形成された各傾斜面と、底板Aの裏面の前後に固着された二つの接触部材E及びFに形成された各傾斜面とを密接に当接させ、この

状態においてトラフ底板Aをトラフ取付台Bの方向に押圧して挟持するトグル挟持機構Gを設けたトラフ取付装置が開示されている。

【0005】 これによれば、トラフ底板Aを取り付ける際にはトグル挟持機構Gによって該トラフ底板Aを上方向からトラフ取付台Bに押しつけて両者を挟持するように着装することができ、取り外す際には該トグル挟持機構Gによる挟持力を除去すればよいこととなる。

## 【0006】

【発明が解決しようとする課題】 ところで、ここに被搬送物は図面上左方向へ搬送されるので、加振装置は図中に示した矢印のように左右方向の振動をトラフに与えることとなる。

【0007】 従って上記装置においては、トラフ底板Aがこの左右方向の振動の影響によって位置ズレを起こさないように、トグル挟持機構Gの挟持力を該振動力に抗して充分大きく設定しないとトラフの取り付けに弛みが生じることとなる。また、トラフ底板Aの着脱が位置決め部材C、Dと、接触部材E、Fと、トグル挟持機構Gとを介してなされるため、これらの部材のみが局部的に振動力を受けることとなり、長年使用によって摩耗劣化してトラフの取り付けに弛みが生じるばかりでなく損傷してしまう虞もある。

【0008】 そして、トラフの取り付けに弛みが生じると振動時に打音等が発生すると共に、加振装置からトラフへ伝達される振動力の伝達効率が低下することとなって被搬送物の搬送能力が減殺されることとなる。

【0009】 そこで本発明は、加振式搬送装置におけるトラフの着脱を簡単且つ確実に行うことができるトラフ取り付け構造であって、部材の劣化や損傷がなく、その結果、振動時の打音や振動力の伝達効率の低下等を誘発することのないトラフ取り付け構造の提供を課題とする。

## 【0010】

【課題を解決するための手段】 すなわち、本願の請求項1に記載の発明（以下「第1発明」という。）は、加振器の上面に、その振動方向に沿って物品を案内するトラフを取り付ける構造であって、上記加振器の上面とトラフの下面とに互いに対接可能にそれぞれ取り付けられた加振器側係止板及びトラフ側係止板と、断面がコ字状とされて上記両係止板の周縁部に係合する係合部材を有する締め付けリングとを有すると共に、上記加振器側係止板の周縁部下面、上記トラフ側係止板の周縁部上面、上記係合部材のコ字状断面内側の上面又は該係合部材のコ字状断面内側の下面の少なくとも一つの面がテーパ面とされて、該テーパ面を介して両係止板の周縁部と係合部材とが係合するように構成され、かつ締め付けリングにその径を縮小させる縮径手段が設けられていることを特徴とする加振式搬送装置のトラフ取り付け構造に関する。

【0011】また、本願の請求項2に記載の発明（以下「第2発明」という。）は、上記第1発明における締め付けリングがその全周に渡って係合部材を有していることを特徴とする。

【0012】そして、本願の請求項3に記載の発明（以下「第3発明」という。）は、上記第1発明における係合部材が加振器側係止板及びトラフ側係止板の周縁部の一部分に係合する係合部材であって、締め付けリングが、複数個の上記係合部材を取り付けたリング部材であることを特徴とする。

【0013】一方、本願の請求項4に記載の発明（以下「第4発明」という。）は、上記第1発明における締め付けリングが2つの略半円状部分に分割され、これら両部分の一方の端部同士が両部分の開閉を可能に連結されていると共に、両部分の他方の端部間に縮径手段が設けられていることを特徴とする。

【0014】

【作用】上記第1発明によれば、加振器の上面及びトラフの下面にそれぞれ加振器側係止板及びトラフ側係止板が互いに対接可能に取り付けられて、これらの両係止板の周縁部に係合する断面コ字状の係合部材を有する締め付けリングが縮径手段によってその径が縮小されることにより、上記両係止板が対接して係止され、その結果、トラフが加振器に取り付けられることとなる。

【0015】ここで締め付けリングの係合部材と両係止板とが係合する部位において、トラフ取り付けのための係止力が両係止板に作用されることとなるが、該係合部材が両係止板と係合するのは両係止板の周縁部であるため、係止力が作用される部位は一箇所に固定されるものではなく、加振器による振動方向のみならず、該振動方向と所定の角度をなす方向においても係止力が作用されることとなる。その結果、一部の部材のみが局部的に振動力を受けて摩耗したり損傷するようなことが回避される。

【0016】さらに、上記加振器側係止板の周縁部下面、上記トラフ側係止板の周縁部上面、上記係合部材のコ字状断面内側の上面又は該係合部材のコ字状断面内側の下面の少なくとも一つの面がテーパ面とされて、該テーパ面を介して両係止板の周縁部と係合部材とが係合するように構成されているので、縮径手段によって締め付けリングの径が縮小されるに伴って係合部材のコ字状断面内側が両係止板の周縁部に水平方向から係合するときの締め付け力がテーパ面に及ぼされて、両係止板を上下方向に圧着する係止力に変換されることとなる。その結果、加振器側係止板とトラフ側係止板とが強固に圧着され、トラフの強固な取り付けが実現するので弛みが生じることがなく、加振器の振動力が効率よくトラフへ伝達されると共に振動時の打音等の発生がなくなる。

【0017】また上記第2発明によれば、締め付けリングがその全周に渡って係合部材を有しているので、係合

部材が両係止板と係合する際はその全周縁部と係合することとなる。従って、係合する部位が両係止板の全周縁部に渡って存在することとなり、トラフ取り付けのための係止力が両係止板に対するあらゆる方向において作用されることとなる。その結果、加振器による振動方向とあらゆる角度をなす方向において、両係止板を上下方向に圧着する係止力が作用されるので、一部の部材の局部的な摩耗や損傷が一層回避されると共に、両係止板の圧着が一層強固なものとなる。

10 【0018】そして、上記第3発明によれば、係合部材が加振器側係止板及びトラフ側係止板の周縁部の一部分に係合する係合部材であって、締め付けリングが、複数個の上記係合部材を取り付けたリング部材であるので、係止板の周縁部長さに応じた種々の長さのリング部材と係合部材との間で部品を交換して相互利用することが可能となり、種々の条件に対応し得る締め付けリングが得られることとなる。

20 【0019】また、リング部材に取り付ける係合部材の数を選択できるので、例えば振動力が比較的小さく、その結果、係止板の全周縁部に係止力を作用させなくても該振動力に抗し得る係止力が得られるような場合等には、必要最小限の数だけ係合部材を取り付ければよく、締め付けリングの軽量化が図られることとなる。

30 【0020】一方、上記第4発明によれば、締め付けリングが2つの略半円状部分に分割され、これら両部分の一方の端部同士が両部分の開閉を可能に連結されていると共に、両部分の他方の端部間に縮径手段が設けられているので、上記一方の端部を支点として2つの半円部分を開くことにより他方の端部同士を離反させたり、逆に閉じることにより他方の端部同士を対接させることができる。従って、この締め付けリングを装着する際や取り外す際には他方の端部同士を離反させて生じた空間を介して行うことができ、締め付けリングの着脱時の取り扱いが容易となる一方、装着中は他方の端部同士を対接させ、これらの間に設けられた縮径手段で締め付けリングの締め付けを行うことができ、トラフの着脱作業の効率化に資することとなる。

【0021】

40 【実施例】以下、本発明の実施例を図面に基づいて説明する。

【0022】図1は本発明の第1の実施例に係る加振式搬送装置を示す側面図であって、加振装置本体1にトラフ10が取り付けられている状態を示す。

50 【0023】まず加振装置本体1には電磁石を振動源とする加振器2が内蔵され、該加振器2による振動の伝達媒体となる板バネ3…3にトラフ取付台4が水平に設置されている。この取付台4の上面には円柱状のトラフ取付用支持部材5及び支持盤6がこの順に取り付けられていると共に、該支持盤6と、加振装置本体1の上部を水平に覆うように備えられた装置台7との間に渡って、弾



性体よりなるシール部材8が設けられて、上記装置台7の洗浄時等に加振装置本体1に異物が入り込まないようになされている。

【0024】また上記トラフ取付用支持盤6の上面には加振器側係止部材9が固定設置されていると共に、トラフ10の下面にはトラフ底板11を介してトラフ側係止部材12が同様に固設されている。そして、これら両係止部材9、12の外周面を取り巻くようにトラフ取付用の締め付けリング20が装着され、該リング20によって上記トラフ側係止部材12が加振器側係止部材9に圧着されて取り付けられている。

【0025】上記両係止部材9、12及び締め付けリング20の構造について説明すると、加振器側係止部材9及びトラフ側係止部材12はそれぞれ断面円形に形成された上下二つの部分からなり、図2に示すように、まず加振器側係止部材9においては、上記支持盤6と接する下部分が支承部9a、及び上部分がディスク部9bとされ、該支承部9aからディスク部9bに至るディスク下面9cは所定の角度で外方向へ突出するテーパ面に形成されている。尚、ディスク部9bの上面は扁平に設けられている。

【0026】一方トラフ側係止部材12においては、上記トラフ底板11と接する上部分が支承部12a、及び下部分がディスク部12bとされ、該支承部12aからディスク部12bに至るディスク上面12cは、上記加振器側ディスク下面9cと同様、所定の角度で外方向へ突出するテーパ面に形成されている。尚、ディスク部12bの下面は、上記加振器側ディスク上面と同様、扁平に設けられている。

【0027】このとき上記両支承部9aと12a、及び両ディスク部9bと12bは相互に断面円の径が等しく、且つディスク部9b、12bの径の方が支承部9a、12aの径より大きく設定されて、両係止部材9及び12は取付時に上下に対称となるように形成されている。

【0028】そして、それぞれ扁平に形成された加振器側ディスク部9bの上面とトラフ側ディスク部12bの下面とを断面円の中心が一致するように密着させてトラフ側係止部材12を加振器側係止部材9の上に載置し、ここで外方向へ突出する両ディスク部9b、12bに対して締め付けリング20が係合している。

【0029】このトラフ取付用のリング20は、図2に示したように、上リム20aと、該上リム20aよりも幾分短い水平長さを有する下リム20bと、側リム20cとを有し、これら各リムによって構成される断面が内側に陥没するコ字状とされていると共に、全体が図3に示すように円弧状とされ、且つその一部に連続しない部分を有するC字状に形成されている。また、この非連続部分の両端には、当該リング20の径を縮小させる縮径装置21が掛け渡されて設けられている。

【0030】そして、縮径装置21のレバー22を倒して締め付けリング20の径を縮小させたときに、上記図2及び図3に示したように、ディスク部9b、12bの外周部が当該リング20の側リム20cに当接せずに陥没部に入り込むと共に、上リム20aと下リム20bがそれぞれテーパ面12cと9cに当接するように、リング20各部の径が上記係止部材9、12の寸法に基づいて設定されている。

【0031】従って、かかる締付時には締め付けリング20の径が縮小されるに伴い、上リム20aと下リム20bと側リム20cとが水平に内方向へ移動し、その結果、上リム20a及び下リム20bが上記係止部材9、12のテーパ面12c及び9cに水平方向からの締め付け力を付与することとなる。ここで上リム20a及び下リム20bがそれぞれ締め付け力を付与するテーパ面12c及び9cは前述のように所定の角度を有しているので、水平方向から及ぼされた締め付け力の一部が、テーパ面12cにおいてはトラフ側係止部材12を図2中下方向へ、及びテーパ面9cにおいては加振器側係止部材9を図2中上方向へそれぞれ作用する圧着力に変換される。

【0032】これによって、トラフ側係止部材12が加振器側係止部材9に強固に係止されることとなり、トラフ10の加振装置本体1への取り付けが実現される。また、締め付けリング20が円弧状に形成されているので、上リム20a及び下リム20bがそれぞれ係止部材12及び9の全周縁部と当接することとなり、その結果、これら両係止部材9、12を上下方向に圧着する係止力が上記全周縁部において均等に作用することとなる。従って、加振器2による振動方向に拘らず、あらゆる方向において係止力が係止部材9、12に作用するので、振動による影響が一部の部材に対して局部的に及ぼされることがなくなると共に、強固なトラフ10の取り付けが可能となる。

【0033】一方、トラフ10を取り外すときには、図4に示すように縮径装置21のレバー22を上げて締め付けリング20の径を拡大させることにより、上リム20a及び下リム20bをそれぞれテーパ面12c及び9cから離反させ、トラフ側係止部材12と加振器側係止部材9とに作用していた係止力を除去する。ここで縮径装置21によって締め付けリング20に与えられていた締め付け力が解除され、該リング20が図示したようにその径が拡大した形状に復帰することにより上記レバー22が図示した位置にセットされる。

【0034】そしてこの締め付けリング20が元の形状に復帰したときに、図5に示すように、水平方向長さが幾分短い下リム20bが加振器側ディスク部9bから完全に離れる一方で、水平方向長さが幾分長い上リム20aがトラフ側係止部材12のテーパ面12c上に引っ掛かって残るように、当該リング20各部の径が上記係

止部材 9, 12 の寸法に基づいて設定されている。

【0035】これによって、締め付けリング 20 の締め付けを解除しても当該リング 20 が係止部材 9, 12 から外れ落ちることがなく、リング 20 が落下損傷することがない。またトラフ側係止部材 12 ないしトラフ 10 を当該リング 20 と共に加振装置本体 1 から取り外すことができるので、部材の離散が回避できる。

【0036】締め付けリング 20 をトラフ側係止部材 12 から取り外すときは、上記縮径装置 21 のレバー 22 を締付時と反対方向へ倒して、図 5 に鎖線で示したように上リム 20 a がトラフ側ディスク部 12 b から完全に離れるまで上記リング 20 の径をさらに拡大させることによって行われる。

【0037】また上記図 3 に鎖線で示したように、締め付けリング 20 の一部に内方向へ突出する突起部 23 を設け、この突起部 23 を嵌め込むことのできる凹陥部 13 を係止部材 9, 12 に形成すると、締め付けリング 20 がこれら係止部材 9, 12 に対して位置決めされることとなり、トラフ 10 の着脱を行う縮径装置 21 の存在箇所が明らかとなって作業効率が向上することとなる。

【0038】ここで締め付けリング 20 の締め付け及びその解除を行う縮径装置は以上説明した機構のものに限られず、図 6 に示す縮径装置 21' のように、ストッパーピン 21 a' を内装するレバー 21 b' をリング 20 の一方の端部に回動自在に取付ると共に、対向するリング 20 の他端には該ストッパーピン 21 a' を掛け止めることができる形状を有する掛止突起 21 c' を設けて、締め付け時には上記レバー 21 b' を倒してそのピン 21 a' を上記掛止部材 21 c' に掛け止める機構を有するものも又使用できる。

【0039】次に本発明の第 2 の実施例について説明する。

【0040】この実施例における締め付けリング 30 は、図 7 に示すように、一部に連続しない部分を有する C 字状に形成されたリング部材 31 と、該リング部材 31 の内面に等間隔に配設された 7 個の係合部材 32...32 及びその非連続部分の両端に配設された 2 個の小さい係合部材 32', 32' とを有すると共に、該非連続部分の両端には上記リング部材 31 の径を縮小させる縮径装置 21 が掛け渡されて設けられている。

【0041】上記係合部材 32 及び 32' は、図 8 に示すように、上リム 32 a と、該上リム 32 a よりも幾分短い水平長さを有する下リム 32 b と、側リム 32 c とを有し、これら各リムによって構成される断面が内側に陥没するコ字状とされて側リム 32 c の外面がリング部材 31 の内面に取り付けられていると共に、各係合部材 32 及び 32' は、図 7 に示したように、係止部材 9, 12 のディスク部 9 b, 12 b の一部とのみ係合する。

【0042】そして、縮径装置 21 のレバー 22 を倒してリング部材 31 の径を縮小させることにより当該締め

付けリング 30 の締め付けが行われ、このとき上リム 32 a と下リム 32 b がそれぞれ係合するテーパ面 12 c と 9 c に当接して、前述した第 1 の実施例と同様、トラフ側係止部材 12 と加振器側係止部材 9 とを上下に圧着する係止力が作用し、トラフ 10 が加振装置本体 1 に取り付けられることとなる。

【0043】ここで 7 個の係合部材 32...32 及び 2 個の小さい係合部材 32', 32' が等間隔に配設されているので、一部の部材だけが加振器 2 からの振動を局部的に受けることがないと共に、係止力が係止部材 9, 12 の周縁部に均等に及ぼされるので、バランスのよい強固なトラフ 10 の取り付けが可能となる。

【0044】また、締め付けリング 30 は係合部材 32, 32' がリング部材 31 に取り付けられてなるので、ディスク部 9 b, 12 b の円周長さに応じた種々の長さのリング部材 31 と、係合部材 32, 32' との間で組合せを変えて締め付けリング 30 とすることができ部材の相互利用が可能となる。

【0045】さらに、リング部材 31 に取り付ける係合部材 32, 32' の数を選択できるので、例えば振動力が比較的弱く、その結果係止部材 9, 12 に与えるべき係止力が小さくても該振動力に抗し得るトラフ 10 の取り付けが可能な場合等には、係合部材 32, 32' の数を例えば 6 個に減らすことも可能で、締め付けリング 30 の軽量化に資することとなる。尚、この場合にも、バランスよくトラフ 10 を取り付けるために、係合部材 32, 32' を等間隔に配設することが好ましい。

【0046】そして本発明の第 3 の実施例における締め付けリング 40 は、図 9 に示すように、ワイヤ部材 41 と、該ワイヤ部材 41 に等間隔に配設された 7 個の係合部材 42...42 とを有すると共に、該ワイヤ部材 41 の両端には、2 個の小さい係合部材 42', 42' を介して縮径装置 51 が掛け渡されて設けられている。

【0047】上記係合部材 42 の側リム 42 c には、図 10 に示すように、水平方向に貫く孔 42 d が設けられ、該孔 42 d を上記ワイヤ部材 41 が貫通することにより各係合部材 42...42 がワイヤ部材 41 に取り付けられる一方、縮径装置 51 には 2 個の小さい係合部材 42', 42' が備えられて、これら係合部材 42', 42' それぞれにワイヤ部材 41 の両端が取り付けられている。

【0048】従って、この締め付けリング 40 においては、係合部材 42...42 をワイヤ部材 41 に通すだけで取り付けることができ、また係合部材 42...42 の位置決めも左右にずらすだけで簡単に行うことができる。

【0049】さらに本発明の第 4 の実施例を図 11 に示す。この実施例における締め付けリング 60 は、断面がコ字状とされた半円形の 2 個の係合部材 61, 61' を揺動可能にヒンジ 62 で連結し、該係合部材 61, 61' の他端にはフック 71 を有する連結部材 70、及び



該フック71を掛け止める掛止部材72がそれぞれ設けられている。

【0050】そして締め付けリング60の装着時には、両係合部材61, 61'の他端同士を近づけてフック71を掛止部材72に掛け、連結部材70のレバー73を倒すことにより、締め付けリング60全体が連続した円形となって2個の係止部材9, 12を圧着することとなる。

【0051】一方、締め付けリング60を係止部材9, 12から取り外すときには、レバー73を上げてフック71を掛止部材72から分離することにより他端同士を離反させ、ヒンジ62によってこの離反間隔を大きくすることにより、当該締め付けリング60を係止部材9, 12から水平方向に抜き取ることができる。

【0052】従ってトラフ側係止部材12が加振器側係止部材9上に載置された状態で、この締め付けリング60を周囲から装着、若しくは抜き取ることが可能となり、リング60の取り扱いが容易となってトラフの着脱作業が効率的に行われることとなる。

【0053】また上記ヒンジ62に代えて、図12に示すように、係合部材81, 81'の端部にそれぞれ突起部82, 82'を設け、該突起部82'にはネジ孔82a'、及び突起部82にはネジ部を有さない大径の孔82aを形成し、ネジ83で両突起部82, 82'をつなぐようにすると、締め付けリング80の締付け時の径をネジ83によって調節することができる。

【0054】さらに図13に示すように、連結部材のレバー73'の内部を中空とし、ここにフック71を取り付けたスライドブロック74を摺動自在に内装し、該ブロック74にレバー73'の外部から側壁を挟んでネジ75を螺合させるようにすると、該ネジ75の回転によってスライドブロック74がレバー73'の内部を移動し、フック71と掛止部材72との間の距離が変化して締め付けリング60の締付け力を調節することができる。

【0055】一方図14に示すように、掛止部材72'を断面コ字状のケーシング72a'と、該ケーシング72a'の背面を螺合貫通するネジ72b'と、該ネジ72b'の端部が回転自在に取り付けられ、上記ケーシング72a'の内部に嵌装されてフック71を掛け止めるストッパ部材72c'とから構成するようにしても、ネジ72b'の回転によってストッパ部材72c'がケーシング72a'の内部を移動し、ストッパ部材72c'とフック71との間の距離が変化して締め付けリング60の締付け力を調節することができる。

【0056】尚、以上説明した各実施例においては、加振器側係止部材9のディスク下面9c及びトラフ側係止部材12のディスク上面12cをテーパ一面に形成する一方で、これら各面とそれぞれ当接係合する締め付けリング20の下リム20b上面及び上リム20a下面を水

平面とした場合を示したが、例えば図15に示すように、断面コ字状を構成する側リム90cに近いほど上下間隔が小さくなるように上リム90aの下面と下リム90bの上面とをテーパ一面とし、加振器側係止部材9'のディスク下面9c'及びトラフ側係止部材12'のディスク上面12c'をテーパ一面とせずに扁平に形成しても、当該締め付けリングの締付け時に水平方向からディスク部9b', 12b'に及ぼされる押圧力が、上リム90aにおいてはトラフ側係止部材12'を図中下方向へ、及び下リム90bにおいては加振器側係止部材9'を図中上方向へそれぞれ圧着する係止力に変換されて両係止部材9', 12'を強固に係止することとなる。

【0057】また、図16に示すように、締め付けリングの下リム90b側のみをテーパ一面とし、他の面は扁平とする場合や、図17に示すように、加振器側係止部材9'のディスク下面9c'のみをテーパ一面とし、他の面は扁平とする場合等においても、両係止部材を上下方向に圧着することとなり、本発明の技術的思想に含まれる。

【0058】つまり、リング締め付け時に相互に当接係合し合う加振器側係止部材のディスク下面、トラフ側係止部材のディスク上面、締め付けリング上リムの下面又は下リムの上面の少なくとも一つの面がテーパ一面に形成されていると、該テーパ一面を介して締め付け力が上下方向の圧着力に変換され、トラフ10を加振装置本体1に係止することができるので、以上図示した場合に限られず、上記四つの面のいずれか一つ以上の面をテーパ一面とすることができる。

【0059】さらに、以上の実施例においては、加振器側係止部材、トラフ側係止部材及びこれらと係合する締め付けリングを円形に形成した場合のみを示したが、本発明はこれに限定されるものではなく、例えば楕円形又は六角形若しくは八角形等の多角形としても、トラフを加振器に取り付ける際の係止力の作用部位が一方向のみに固定されず他方向に渡るので、同様の作用効果が得られる。

【0060】

【発明の効果】以上説明したように、本発明によれば、締め付けリングの締め付けによって生じるトラフ取り付けのための係止力の作用部位が、加振器側係止部材及びトラフ側係止部材の周縁部に、複数且つ均等に存在するので、加振器による振動方向に拘らず、局所的な振動力の影響が低減されて、部材の局所的な摩耗や損傷が回避される。

【0061】また、加振器側係止部材及びトラフ側係止部材と、締め付けリングとの係合がテーパ一面を介して行われるので、水平方向から及ぼされた押圧力が両係止部材を上下方向に圧着する係止力に変換されてトラフが強固に取り付けられる結果、弛みが生じず、加振器の振

動力が効率よくトラフへ伝達されると共に、振動時の打音等の発生がなくなる。

【0062】さらに、締め付けリングとして、リング部材に複数個の係合部材を脱着可能に取り付ける構成とすると、部品の交換によって様々な大きさの係止部材に対応することができると共に、加振器の振動力の強弱によって係合部材の数を減らすことができる結果、効率よく締め付けリングの軽量化が図られることとなる。

【0063】一方、締め付けリングを連続した輪環状でなく、2つの半円状部分に分割し、各端部同士を開閉可能に連結すると、この半円状部分の開閉によって生じる空間を介して当該締め付けリングの装着又は取り外しが容易となり、トラフの着脱作業の効率化に資することとなる。

#### 【図面の簡単な説明】

【図1】 本発明の第1の実施例に係る加振式搬送装置を示す側面図である。

【図2】 上記加振式搬送装置の要部拡大部分断面図である。

【図3】 図2に示すア－ア線における水平断面図である。

【図4】 上記実施例の作用を説明する図2に示すア－ア線における水平断面図である。

【図5】 図4に示す状態における加振式搬送装置の要部拡大部分断面図である。

【図6】 上記第1の実施例における縮径装置の別の態様を示す水平要部拡大部分断面図である。

【図7】 本発明の第2の実施例に係る加振式搬送装置の要部水平断面図である。

【図8】 図7に示す状態における部分側面図であ

る。

【図9】 本発明の第3の実施例に係る加振式搬送装置の要部水平断面図である。

【図10】 図9に示す状態における部分側面図である。

【図11】 本発明の第4の実施例における締め付けリングの平面図である。

【図12】 上記第4の実施例における締め付けリングの別の態様を示す部分拡大図である。

【図13】 同じく第4の実施例における締め付けリングの別の態様を示す部分拡大図である。

【図14】 同じく第4の実施例における締め付けリングの別の態様を示す部分拡大図である。

【図15】 別の実施例における加振式搬送装置の要部拡大部分断面図である。

【図16】 同じく別の実施例における加振式搬送装置の要部拡大部分断面図である。

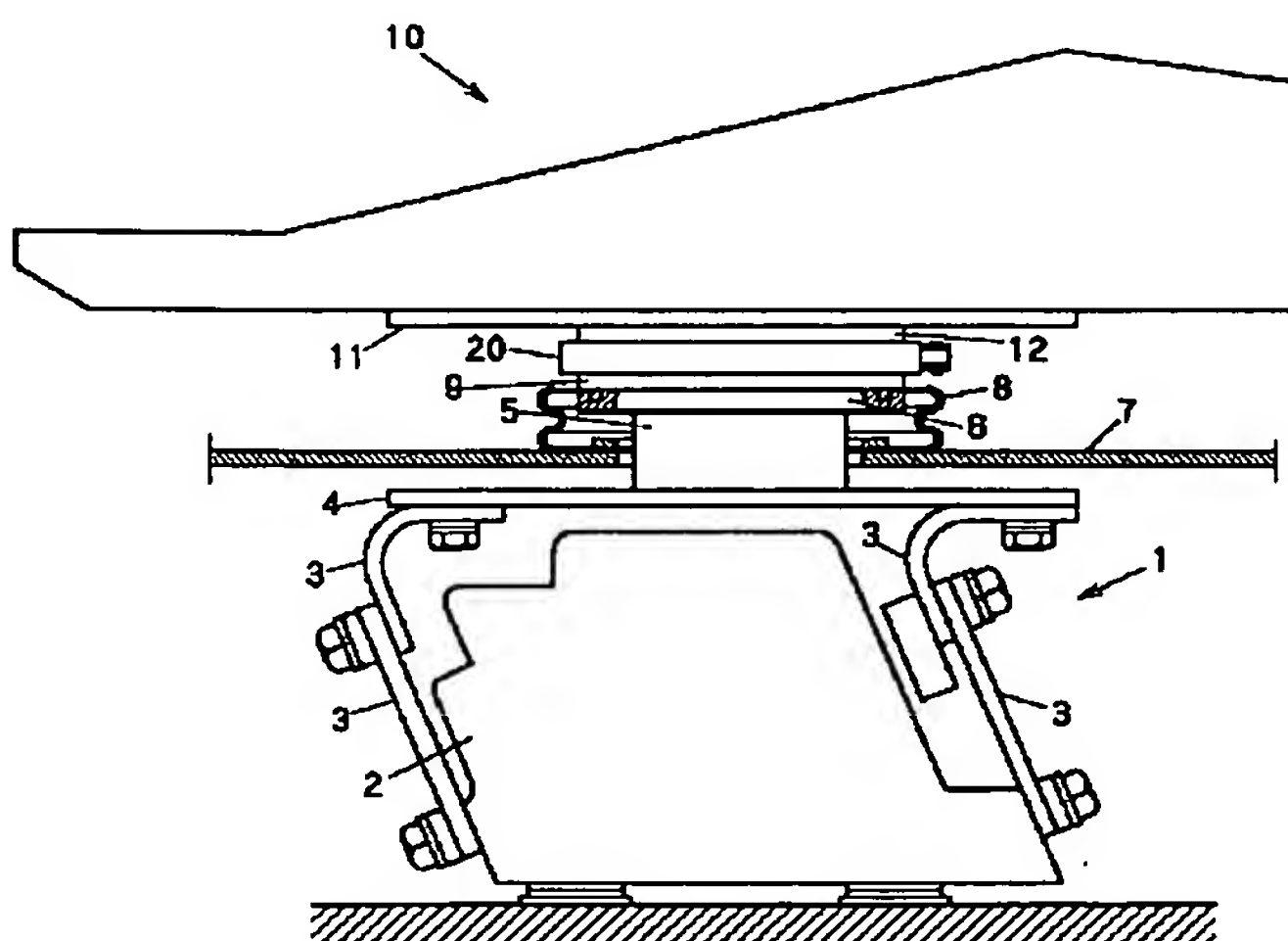
【図17】 同じく別の実施例における加振式搬送装置の要部拡大部分断面図である。

【図18】 従来の加振式搬送装置における問題点についての説明図である。

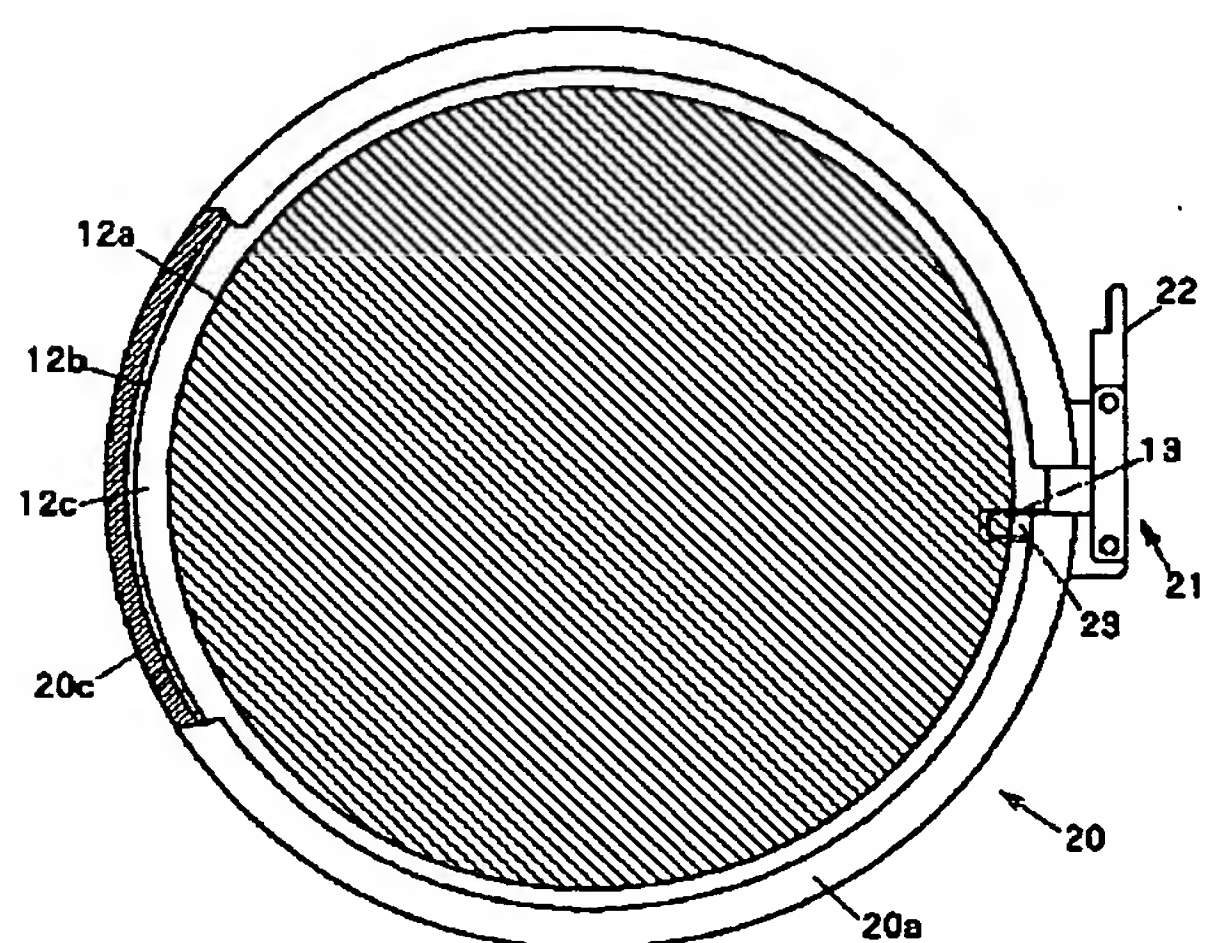
#### 【符号の説明】

1	加振装置本体
2	加振器
9	加振器側係止部材
9c, 12c	テーパ面
10	トラフ
12	トラフ側係止部材
20	締め付けリング
21	縮径装置

【図1】

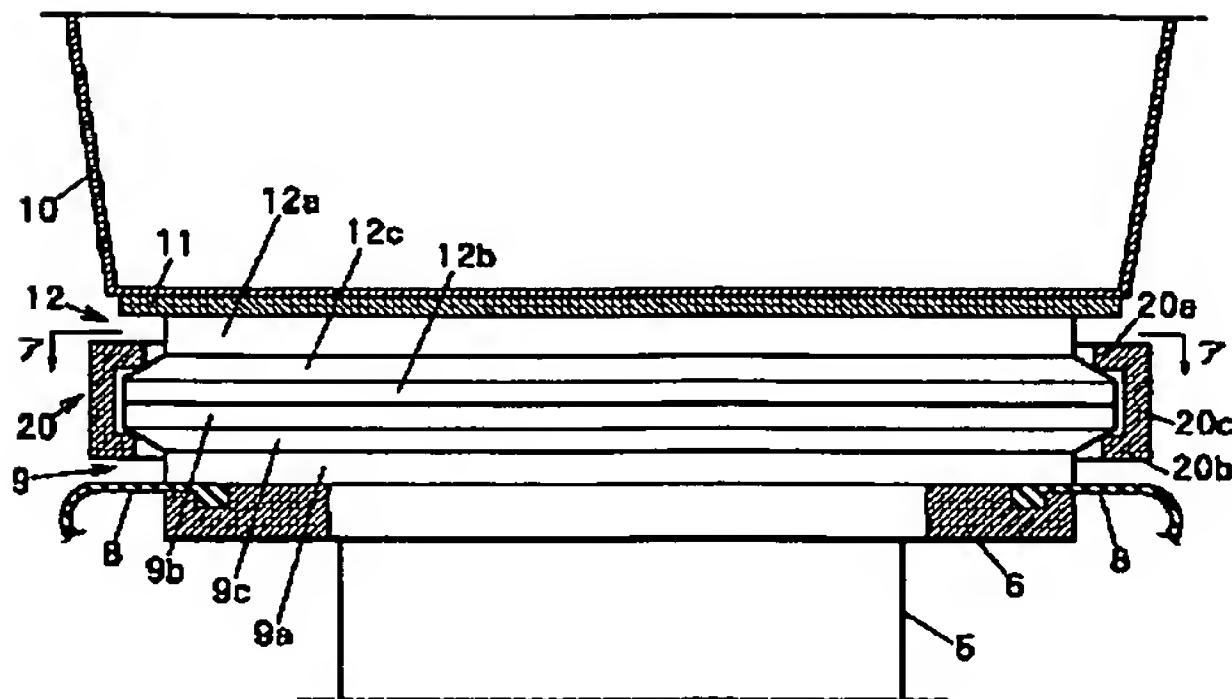


【図3】

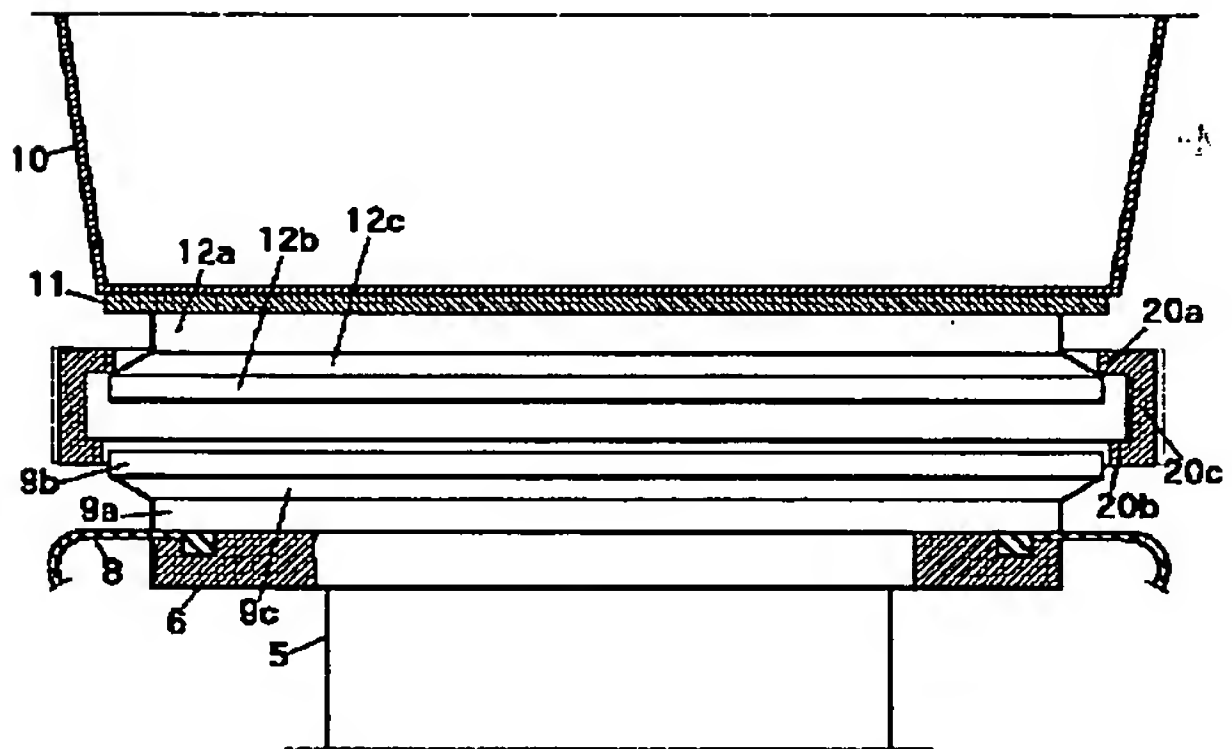




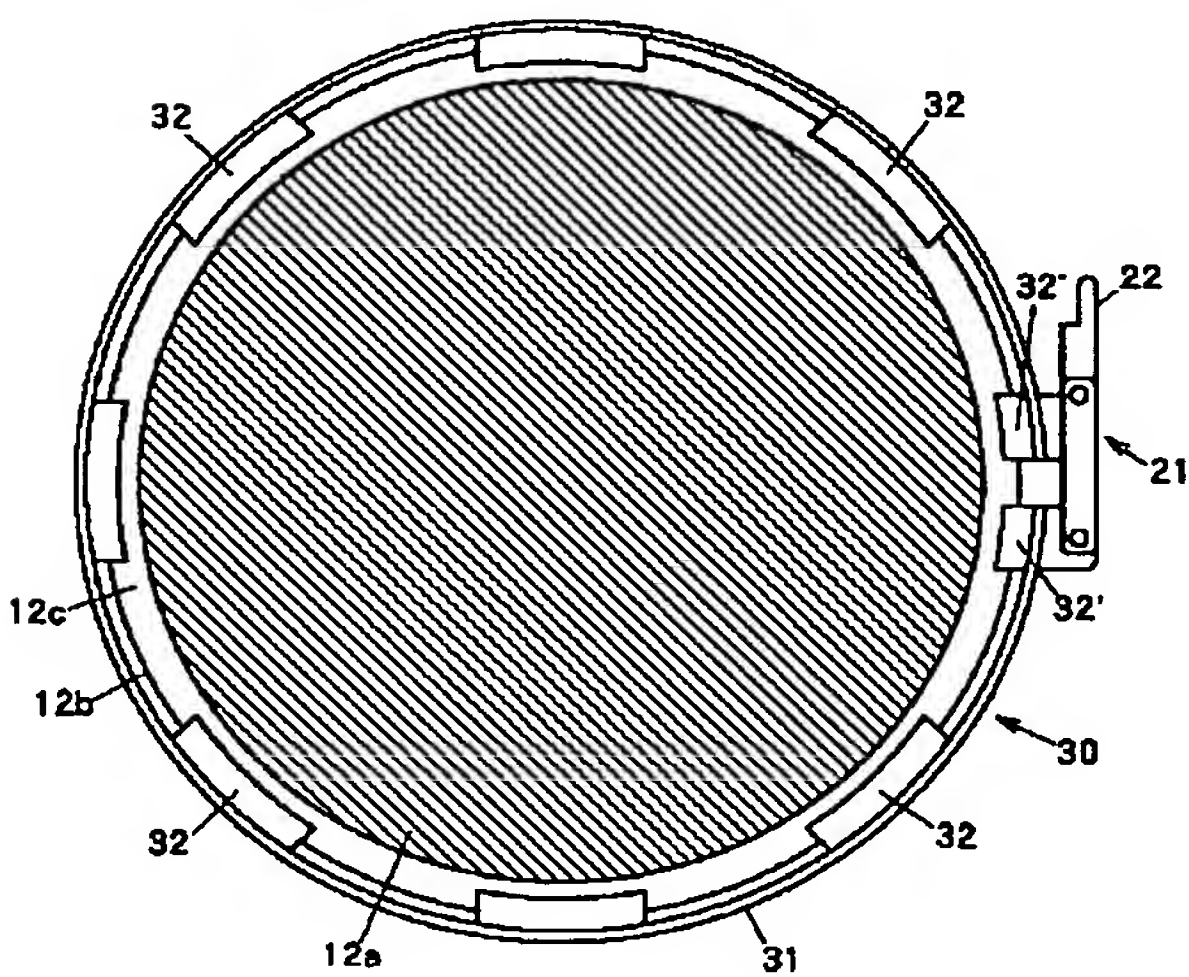
【図2】



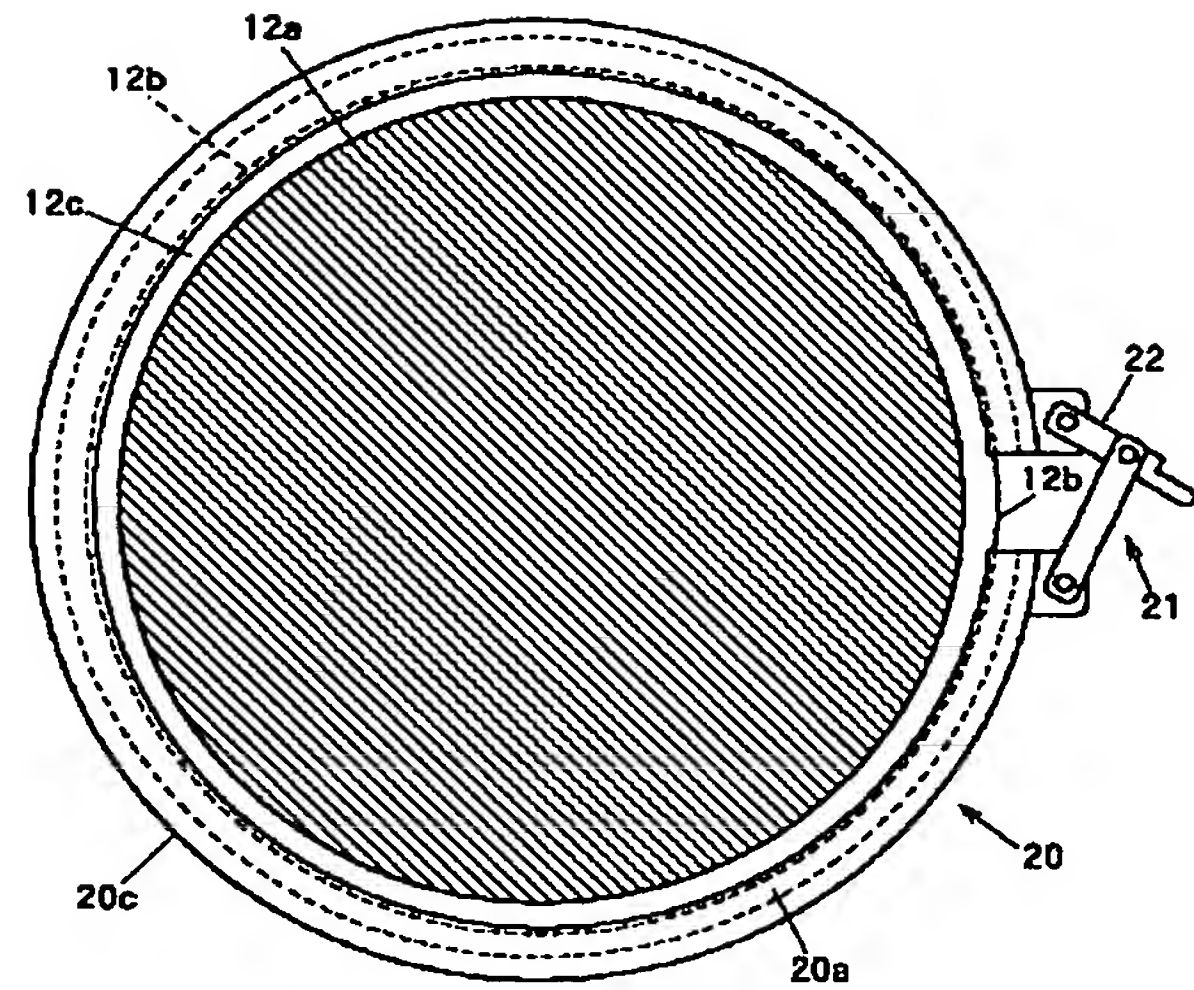
【図5】



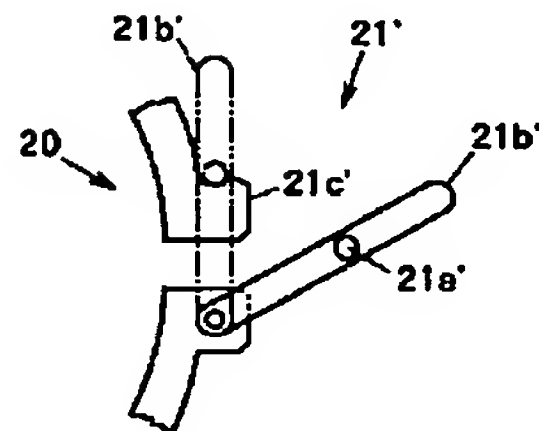
【図7】



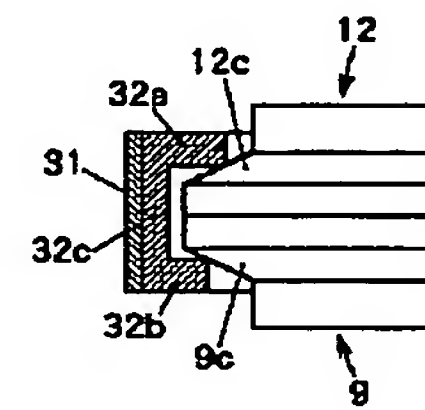
【図4】



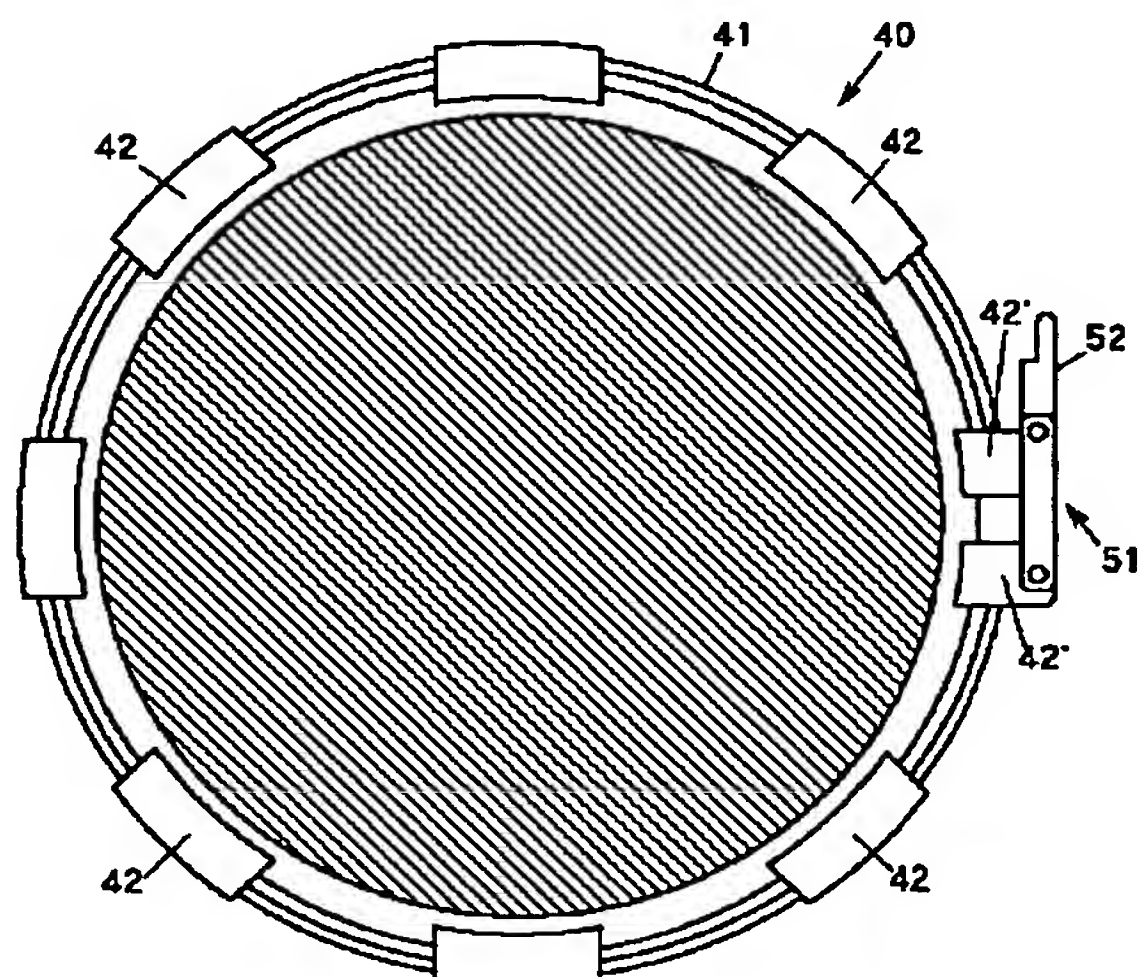
【図6】



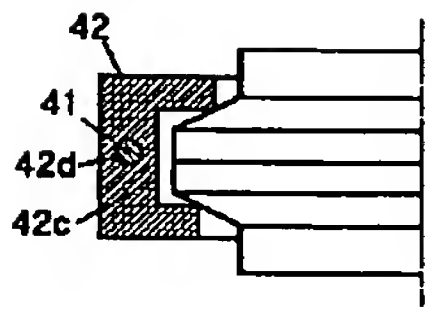
【図8】



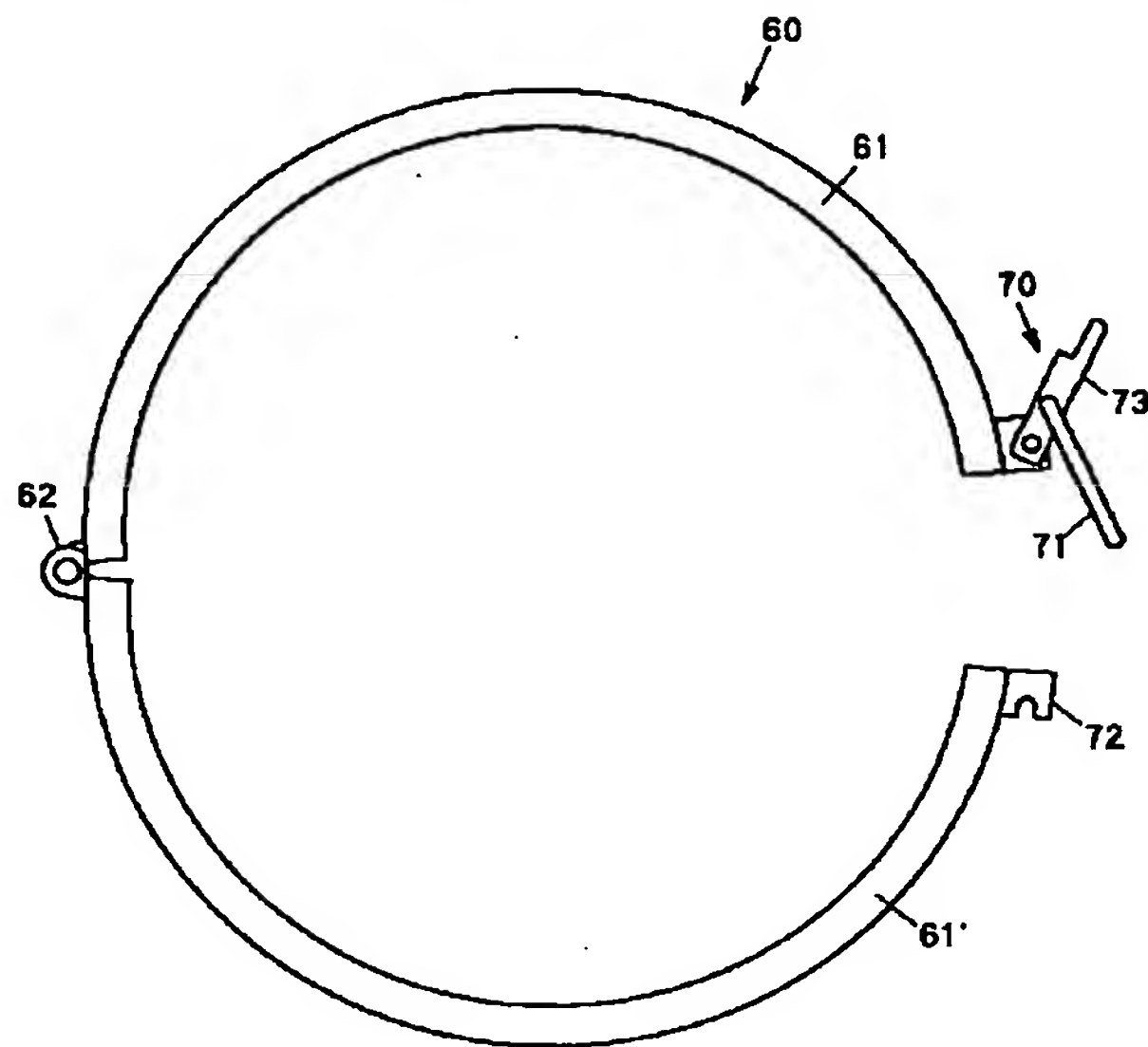
【図9】



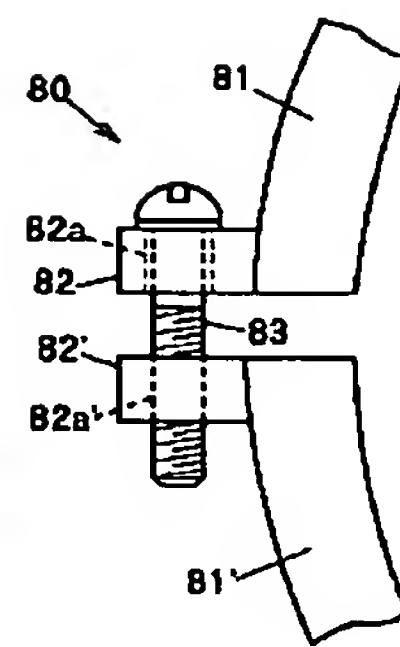
【図10】



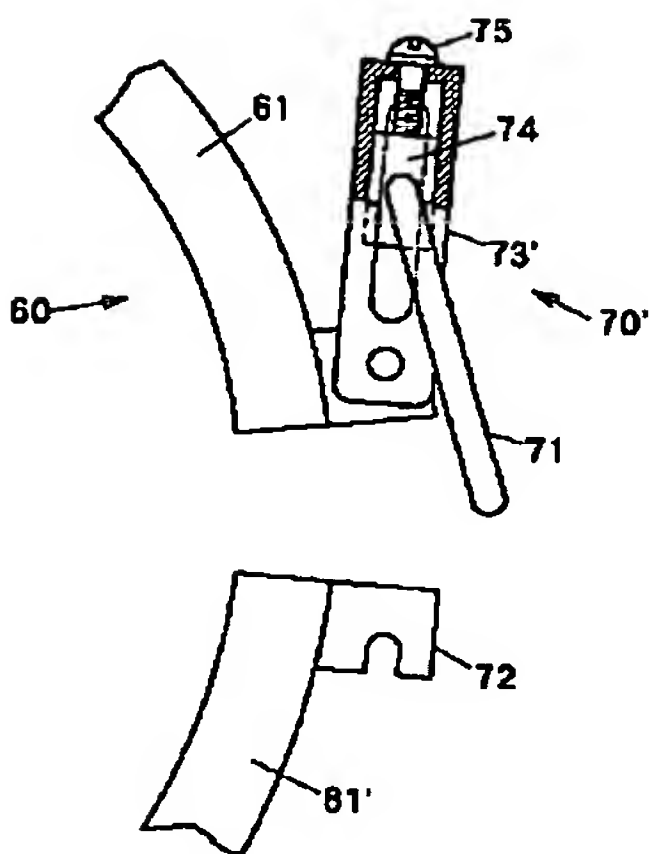
【図11】



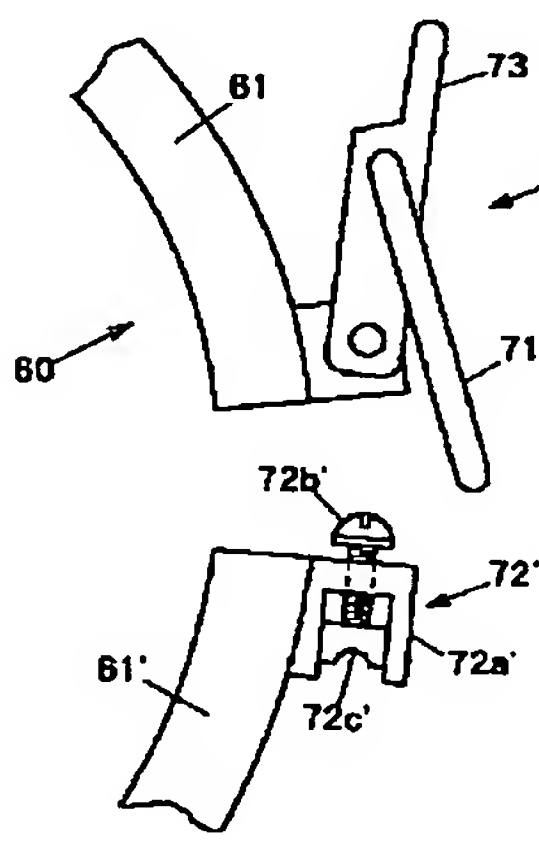
【図12】



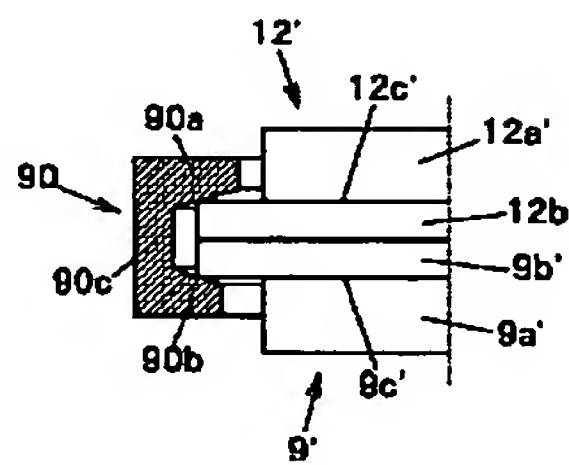
【図13】



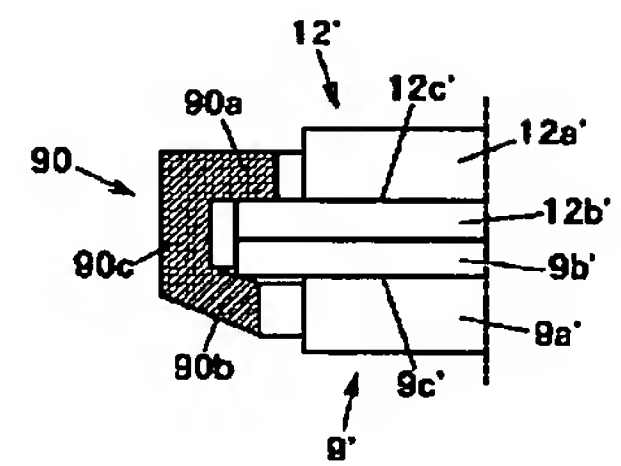
【図14】



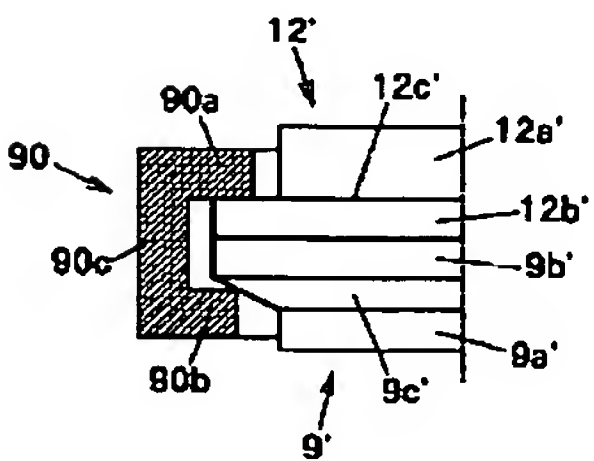
【図15】



【図16】



【図17】



【図18】

